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Apparatus for the production of transversely ribbed tubes

The invention concerns an apparatus for the production of transversely ribbed tubes, comprising mold jaw halves which are circulatorily movable in a condition of bearing against each other along
5 two guide paths by means of a respective associated drive device, wherein the two guide paths have a common mold section, a respective return section and two respective direction-changing sections, wherein the respective direction-changing section has a direction-changing member provided with an arcuate guide edge for the mold jaw halves and is
10 linearly movably guidedly arranged on a base element fixed with respect to the machine and is connected to a compensating device which can compensate for a tolerance play of the mold jaw halves which circulate along the associated guide path.

Apparatuses for the production of transversely ribbed tubes are
15 known per se in a large number of configurations, they are usually referred to as corrugators.

In the known apparatuses of the general kind set forth, longitudinal expansion of the mold jaw halves, which is caused by the operating temperature, gives rise to the need to correspondingly lengthen the two
20 guide paths in order to prevent the mold jaw halves from becoming jammed along the guide paths. That length adjustment of the two guide paths has hitherto been effected for example by manual displacement of the direction-changing members. That displacement requires personnel with a good level of skill. The apparatus is not in operation during the
25 displacement procedure so that productivity is reduced.

An apparatus of the kind set forth in the opening part of this specification is known for example from DE 31 18 932 C2. In that known apparatus the mold jaw halves are mounted on chains which are guided around direction-changing wheels forming the direction-changing

members. The direction-changing wheels have a circular periphery, and they are displaceable on a stationary machine frame structure in respect of height and transversely with respect to the advance direction, that is to say the production direction. That displacement is effected manually.

5 An apparatus of the kind set forth in the opening part of this specification is also known from US No 328 030. In that known apparatus adjustment of the direction-changing wheels is also effected by hand.

US No 4 824 354 discloses a hydraulic press having first and second mold jaws mounted to belts. The mold jaws are circulantly movable
10 along two endless guide paths by means of an associated drive device. The two guide paths form a common mold section. The direction-changing sections of the two mold sections each have a respective direction-changing member formed by a roller with a circular periphery. The direction-changing rollers are resiliently movably mounted to a
15 support structure which is fixed with respect to the machine, in order to tension the belts and to compensate for temperature-dependent and/or speed-dependent tolerances.

DE 196 19 429 A1 also discloses an apparatus of the kind set forth in the opening part of this specification. In that known apparatus the
20 mold jaw halves which circulate along the respective guide path are connected together by means of connecting elements formed by tension springs. In the entry region into the mold section, the direction-changing members are provided with a guide edge which is not circular but approximately elliptical in order to prevent overlapping contact of the mold
25 jaw halves at their edges.

The object of the invention is to provide an apparatus of the kind set forth in the opening part of this specification, which is of a simple design configuration, in which manual displacement of the direction-changing members for adaptation to the respective operating conditions is
30 avoided, and which can be operated at a high level of productivity.

In accordance with the invention, in an apparatus of the kind set forth in the opening part of this specification, that object is attained in that the respective direction-changing member comprises a low-wear plastic material and the tolerance play is dependent on the temperature and/or

5 the speed of the mold jaw halves, that the respective direction-changing member is provided with a clothoid-like guide edge for the associated mold jaw halves and that the compensating device has an air spring which can be subjected to the action of compressed air.

The compensating device connected to the respective direction-changing member automatically compensates for any change in length of the mold jaw halves, which is caused by the operating temperature involved, insofar as the associated guide path is automatically adjusted for adaptation to said change in length. The compensating devices also serve at the same time automatically to compensate for, that is to say equalize

10 influences, caused by speed, that is to say centrifugal force, of the mold jaw halves along the direction-changing members. The configuration of the apparatus, that is to say the combination of the direction-changing members which define the direction-changing sections, with the compensating devices, affords the advantage that manual adjustments of

15 the direction-changing members for adaptation to changes in length of the mold jaw halves, caused by the operating temperature involved, are not required, that the influences of centrifugal force in respect of the mold jaw halves are compensated along the direction-changing members, and that the productivity of the apparatus is improved.

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25 The fact that the respective direction-changing member has a clothoid-like guide edge for the associated mold jaw halves prevents an unwanted jump movement at the transition between the respective direction-changing member and the straight mold section or the straight return section respectively, and in that way improves the productivity of

30 the apparatus.

In accordance with the invention the compensating devices are formed by air springs which can be subjected to the action of compressed air. Such a compensating device is described for example in the company prospectus from Festo "Fluid Muscle Type MAS..." 0010NH.

5 It has proven to be desirable in the apparatus according to the invention if the respective direction-changing member comprises a low-wear plastic material which preferably involves a plastic material with oil inclusions.

An embodiment of the apparatus according to the invention and
10 essential details thereof are described hereinafter and illustrated in the drawing in which:

(continued on page 4 line 6 of the translation of the original PCT text)